Based on the information provided in a January 14, 2013 memorandum, Superfund requested consultation on the proposed remedial actions for the Sauget Area 1 Site consisting of three closed waste disposal areas (Sites G, H, and I), a backfilled impoundment (Site L), an inactive borrow pit (Site M), a closed construction debris disposal area (Site N), and approximately 3.5 miles of Dead Creek. The Site will be addressed under a 2013 Proposed Plan that relates to soil and groundwater source contamination only, to be followed by a public comment period and selection of a final remedy presented in a Record of Decision.

Draft Proposed Plan

The Preferred Alternative proposed by Superfund to clean up the Sauget Area 1 Site is:

- Pooled DNAPL Recovery at Site I
- Pulsed Air Biosparging of DNAPL Areas at Sites G, H, and I South
- 35 IAC 724 Compliant Soil Cover at Sites G, H, and L
- 35 IAC 724 Compliant Crushed Rock Cover at Site I South
- Asphalt Pavement at Site G West
- Judith Lane Containment Cell Operation and Maintenance
- Monitoring Well Network
- Utility Relocation at Sites H and I South
- Institutional and Access Controls at Sites G, H, I, L, and N

If the pilot study for pulsed air biosparging of DNAPL areas at Sites G, H, and I South finds the technology not to be feasible, a RCRA Subtitle C cap will be placed over Sites G, H, and I South (with soil cover modifications) rather than the 35 IAC 724 compliant soil or crushed rock cover.

The sites proposed for cleanup typically contain PCB concentrations in soil/waste in the tens to thousands of parts per million (ppm). Significant concentrations of PCBs are also present in NAPL, leachate, and groundwater at the sites. Groundwater downgradient of the sites contains PCB concentrations that exceed the groundwater protection standard of 0.5 parts per billion (ppb). Past disposal practices at the Sauget Area 1 Site have resulted in uncontrolled releases of PCB to the environment. Additionally, wastes were disposed of in landfills during a time when local industries were very active and groundwater was being pumped extensively. Much of the industrial activity and groundwater pumping in the immediate area has ceased and the water table of the American Bottom aquifer has rebounded to its natural level, as controlled by the Mississippi River. Current groundwater levels rise and fluctuate within the buried wastes and continually leach out hazardous waste constituents to the American Bottom aquifer. It is important that the Preferred Alternative control the sources of releases and contain the PCBs so they no longer migrate. We note that at the rivers edge, a groundwater migration control system (GMCS) has been installed that partially captures the groundwater contaminant plume originating from the Sauget Area 1 Site.

Each component of the Preferred Alternative is discussed below as it relates to the proposed risk-based disposal of PCB remediation waste [40 CFR §761.61(c)]. We also discuss areas of the Site that are not proposed for any further remediation (Site M and Dead Creek) or work (residential).

Pooled DNAPL Recovery at Site I

Liquid DNAPL has been collected from bedrock recovery well BR-I since November 2006. About 380 gallons of DNAPL has been removed from the weathered bedrock underlying Site I. Recovery is ongoing and the Proposed Plan would require further investigation to determine the extent of pooled DNAPL and its recovery from additional bedrock wells if feasible. The final plan for the collection and management of DNAPL would be determined upon completion of a pilot study.

The DNAPL beneath the site at BR-I was collected and characterized for site contaminants in October 2004, including PCBs. Target analytes comprised 16.7% of the DNAPL sample by weight. The principal constituents by mass fraction are 1,2,4-trichlorobenzene (14%), hexachlorobenzene (1%), and 1,4-dichlorobenzene (0.8%). PCB was also detected comprising 0.15% (1,500 ppm) by weight fraction of the DNAPL. Significant concentrations of PCBs (hundreds to thousands of ppm) are also known to be present at Site I in surface and subsurface soils and leachate.

We understand that DNAPL is currently recovered at BR-I using a dedicated electric-powered piston pump. A portable generator is used by a work crew to evacuate the well on a biweekly schedule and the recovered fluid is discharged to and stored in 55 gallon steel drums placed inside a secondary containment pan. DNAPL constitutes about 20% of the recovered fluid. Any separation of the DNAPL from recovered fluid or the number of drums and frequency of their removal for off-site disposal is not known. Any additional characterization of the recovered fluid/DNAPL for PCB concentrations is not known.

The Proposed Plan requires further investigation for DNAPL, a more frequent DNAPL recovery schedule, and possible additional recovery wells. Any recovered fluids would be transported to an approved off-site facility for incineration. The generation, storage, treatment, and off-site disposal of DNAPL that is known to be a liquid PCB remediation waste is subject to specific TSCA requirements.

Any person disposing of liquid PCB remediation waste (the DNAPL) should do so under a risk-based disposal approval [40 CFR §761.61(c)] or meet the performance-based disposal requirement found at 40 CFR §761.61(b)(1) which requires incineration. Storage requirements for liquid PCB remediation waste for up to 30 days can be found at 40 CFR §761.65(c)(1). Longer storage periods require specific storage unit requirements found at 40 CFR §761.65(b)(1), including criteria for a roof, walls, and floor. The containers and storage area used for liquid PCB remediation waste must be marked as required in 40 CFR §761.65(c)(3). Any treatment of the recovered fluid to remove or separate NAPL from water must meet the decontamination standards found at 40 CFR §§761.79(b) and (g). These requirements would need to be met for both current and future DNAPL management practices. In the alternative, a site-specific PCB management plan could be

submitted for risk-based disposal approval [40 CFR §761.61(c)] upon completion of the pilot study when the full extent of the DNAPL recovery system is known.

Pulsed Air Biosparging of DNAPL Areas at Sites G, H, and I South

A pulsed air biosparging (PABS) system would inject atmospheric air into the middle and deep hydrogeologic units of the American Bottom aquifer to promote in-situ aerobic biodegradation. The injection areas would be located in the areas of residual DNAPL. Passive vent wells would be used to recover any vapors near the surface and the vapors (likely containing VOCs) would be treated in drums of granular activated carbon.

The purpose of PABS is to reduce the mass of chlorinated benzenes released to the American Bottom aquifer. It is not intended to treat PCBs present in groundwater. We note that a similar system using pure oxygen has been operating as part of the final remedy at the Solutia RCRA facility to bioremediate chlorinated benzenes. The American Bottom aquifer is depleted of dissolved oxygen because of the presence of large amounts of more easily biodegradable benzene. The addition of oxygen is expected to allow for aerobic biodegradation resulting in contaminant mass reduction of chlorobenzene and dichlorobenzenes. LCD can share the performance data for this technology at the Solutia facility with Superfund as it becomes available.

PCBs exceeding the groundwater protection standard of 0.5 ppb are present and migrating in groundwater. Concentrations are as high as 12.2 ppb at Site H and 0.88 ppb at Site I South. Lesser amounts of PCBs (0.58 to 0.78 ppb) occur in groundwater immediately downgradient of Sites G, H, I, L, and Creek Segment B. PCBs may be encountered in groundwater during the PABS pilot study and potential PABS system implementation. This contaminated groundwater would not be withdrawn and any biodegradation of PCBs (if possible) would be in situ. Vaporization of PCBs and collection in the treatment drums would not be expected. However, significant concentrations of PCBs (hundreds to thousands of ppm) present in Sites G, H, and I South soil, waste, leachate and LNAPL requires that remediation wastes generated during PABS installation and operation be managed as PCB remediation wastes subject to the disposal requirements found at 40 CFR §761.61(a)(5).

35 IAC 724 Compliant Soil Cover at Sites G, H, and L

The soil cover is proposed to prevent exposure to the waste and affected soils while providing permeability for air transfer and infiltration of moisture. Permeable covers may be more appropriate with biosparging where air is injected into the saturated zone beneath the capped area. This type of cap is considered to be more appropriate for use with a PABS system rather than a RCRA Subtitle C cap designed with a low permeable clay, geotextile and HDPE geomembrane because it would allow some air movement through the waste and minimize soil vapor accumulation in the waste and fill materials. Also, since the lower portion of waste is below the water table, a RCRA Subtitle C cap would not address the flushing effects of groundwater in contact with the buried waste.

The soil cover system at these sites would consist of general fill necessary to achieve the required contours and a 24" soil cover to support a vegetative final cover. The specific type of soil to be used in the cover is not provided in the Proposed Plan or RI/FS. Because of the presence of significant PCB concentrations (hundreds to thousands of ppm) in subsurface soil and waste at these three sites and PCB in LNAPL (0.26% by weight fraction) at Site G, a RCRA Subtitle C cap is preferred. However LCD recognizes that such a cap would not control releases caused by groundwater contacting buried wastes and that a permeable cover may be more appropriate with a PABS system.

Superfund should consider making adjustments to the PABS system if implemented so that it would be compatible with a low permeability soil cover that at a minimum, meets the parameters found at 40 CFR §761.75(b)(1)(ii) through (v), including a permeability of at least $1x10^{-7}$ cm/sec, greater than 30% soil passing a No. 200 Sieve, greater than 30 liquid limit, and greater than 15 plasticity index. This could include an engineered vent well system that will more actively control and recover generated vapors beneath the cap. Also, if the GMCS at the rivers edge can be shown to hydraulically control and capture contaminants from these sites, it may obviate the need for a RCRA Subtitle C cap. We understand that Superfund will re-evaluate the need for a more impermeable cap after a pilot study assesses the effectiveness of a PABS system.

<u>35 IAC 724 Compliant Crushed Rock Cover at Site I South</u>

Different from the proposed soil cover at Sites G, H, and L, crushed rock would be used instead at Site I South so the area can continue to be used for truck trailer parking. Because access would not be restricted at Site I, expected occupancy should be defined (low or high) to assess the potential risk to be considered in the risk-based disposal process.

The proposed cover would consist of general fill as necessary to achieve the required contours and an 18" crushed rock layer (IDOT CA-6) overlain by a 2" diameter crushed rock layer. Because of the presence of significant PCB concentrations (hundreds to thousands of ppm) in surface and subsurface soils and in leachate, a RCRA Subtitle C cap is preferred. However we recognize that such a cap would not control releases from groundwater contacting buried wastes and that a permeable cover may be more appropriate for use with a PABS system.

Superfund should consider making adjustments to the PABS system if implemented so that it would be compatible with a low permeability soil cover that at a minimum, meets the parameters found at 40 CFR §761.75(b)(1)(ii) through (v), including a permeability of at least $1x10^{-7}$ cm/sec, greater than 30% soil passing a No. 200 Sieve, greater than 30 liquid limit, and greater than 15 plasticity index. This could include an engineered vent well system that will more actively control and recover generated vapors beneath the cap. Also, if the GMCS at the rivers edge can be shown to hydraulically control and capture contaminants from these sites, it may obviate the need for a RCRA Subtitle C cap. We understand that Superfund will re-evaluate the need for a more impermeable cap after a pilot study assesses the effectiveness of a PABS system.

Superfund may also want to consider a concrete or asphalt cap with a minimum thickness of six inches [see 40 CFR §761.61(a)(7)] to accommodate truck parking. Porous asphalt or pervious concrete pavement can be used if air and water exchange through the cover is desired for use with the PABS system. A comprehensive inspection program and O&M plan is essential for the installed cover to ensure its integrity is maintained as it is subject to truck traffic. The expected occupancy for the site used for truck trailer parking should be determined to aid in the development of the specific cover allowable to prevent an unreasonable risk of injury to health or the environment.

Asphalt Pavement at Site G West

An asphalt pavement will be installed to cap the parking area surrounding the Weise Engineering building. An asphalt cap can be used here because the PABS system to be located at Site G is significantly far enough away from the parking area. Site G has PCB concentrations in subsurface soils of hundreds to thousands of ppm. An asphalt cap meeting the requirements of 40 CFR §761.61(a)(7) and (8) is recommended, including a minimum thickness of 6 inches. We agree with Superfund that this type of cap is sufficient and would prevent an unreasonable risk of injury to health or the environment when properly maintained. A comprehensive inspection program and O&M plan for the asphalt pavement should be developed to ensure its integrity is maintained as it is subject to vehicular traffic.

Judith Lane Containment Cell Operation and Maintenance

The existing containment cell is a RCRA and TSCA-compliant landfill that manages contaminated sediment and underlying soils that were excavated during the Dead Creek removal action. O&M activities include inspections, leachate sampling, collection and treatment of leachate, effluent and groundwater sampling and analysis, and maintenance and repairs as needed. Permitting for additional disposal of about 12,000 cubic yards of PCB remediation waste from the Solutia RCRA facility at the Superfund containment cell is currently being reviewed pursuant to an Illinois remedial action plan permit (RAPP) and TSCA coordinated approval (40 CFR §761.77). This review process envisions that the O&M in the Proposed Plan and financial assurance would be maintained under any approved RCRA RAPP and TSCA Coordinated Approval. This permit process is expected to be completed in 2013.

Monitoring Well Network

A monitoring well network will be proposed and installed. Periodic groundwater sampling and testing is proposed for VOCs, SVOCs, and selected geochemical parameters. Because PCBs are present in groundwater and NAPL at and downgradient of Sites G, H, I, L, and Creek Segment B above the groundwater protection standard of 0.5 ppb, we recommend that PCBs also be included in the parameter list for monitoring releases from the sites.

Utility Relocation at Sites H and I South

A water supply line, fuel pipeline, and telephone cable along Queeny Avenue adjacent to Sites H and I South will be relocated to protect utility workers. The Proposed Plan does not describe whether the utilities will be abandoned in place or removed. If abandoned in place, a plan should be submitted describing how the pipes will cut and grouted to eliminate potential conduits. In-situ concentrations of PCBs identified during the 2007 utility corridor investigation at eight locations along Queeny Avenue, if deemed to be sufficient, may be used to delineate the extent of PCB remediation waste around the abandoned utilities. The extent of contamination should be noted in an institutional control such that any future excavations in the area will have notification of the site conditions, provide for proper protective gear for workers, and ensure any excavated PCB remediation waste is properly disposed.

If removal of the utilities will take place, any soil and man-made material (porous and/or non-porous surfaces) that might be generated from within the PCB-contaminated utility corridor and Sites H and I South during the relocation project will require management for disposal as a PCB remediation waste because of the presence of significant concentrations of PCBs (typically hundreds to thousands of ppm) in soil/waste. Any generated non-porous man-made materials are subject to a standard wipe test [see 40 CFR §761.61(a)(4)] to assess appropriate management for disposal.

Appropriate worker protection needs should be identified prior to the relocation project. Ensure that the engineered caps for Sites H and I South meeting the TSCA requirements described above fully extend over the former utility corridor after the utilities are relocated.

Institutional and Access Controls at Sites G, H, I, L, and N

Institutional and access controls proposed could include deed restrictions, zoning restrictions, and access restrictions such as fences or warning signs. At a minimum, institutional controls will be implemented in accordance with the Illinois Uniform Environmental Covenant Act to restrict residential development.

We note that the final remedy at the Solutia RCRA facility required an Environmental Land Use Covenant (ELUC) as detailed at 35 IAC 742.1010 that imposes land use limitations or requirements related to environmental contamination. Specific components of the Solutia ELUC identify and restrict specific PCB-contaminated areas pursuant to TSCA at 40 CFR §761.61(a)(8). LCD can share the RCRA ELUC for the Solutia facility with the Superfund program. It may be very similar to what may be required at the Sauget Area 1 Site and has been implemented and recorded by Solutia which is a PRP at the Sauget Area 1 Site.

Contingent RCRA Subtitle C Cap at Sites G, H, and I South

If the pilot study concludes that PABS is not feasible, a RCRA Subtitle C cap will be installed at Sites G, H, and I South. The RCRA Subtitle C cap for Sites G and H would meet TSCA requirements. However, at Site I South, an alternative 24"crushed rock layer for truck trailer parking would be placed directly over a geotextile-geonet-geotextile-

HDPE geomembrane, clay liner, and sand bedding layer. Such a proposed multilayer cap is consistent with the designed standards for a TSCA chemical waste landfill provided it can be demonstrated that the crushed rock layer and truck traffic will not compromise the lower engineered liner. Superfund may also want to consider installing and paving a RCRA Subtitle C cap at Site I South with asphalt or concrete to accommodate truck traffic.

We believe that this construction is equivalent to the TSCA requirements given the presence of the lower man-made liner system directly above the fill.

Site M

Site M is an old borrow pit that was remediated as part of the Dead Creek removal action in 2001 and 2002. Contaminated sediment was removed and the approximate 14 foot deep pit was backfilled with soil from an adjoining property, graded to drain to Dead Creek, vegetated, and fenced. No additional remediation at Site M is proposed in the draft Proposed Plan.

The *Sauget Area 1 Dead Creek Final Remedy Creek Bottom Soil Engineering Evaluation/Cost Analysis Human Health Risk Assessment* (ENSR, April 2006) was reviewed by LCD. The PCB concentration remaining in soil beneath the backfill is calculated to be 13.07 ppm (95% UCL exposure point concentration). The potential human health risks associated with this concentration to a recreational teenager are within the acceptable target risk range and the hazard index (HI) is less than 1. For a construction worker scenario, the potential risks are within the acceptable target range but the HI is slightly greater than 1 at 1.16. The PCB component of the hazard index is 0.39. This slight exceedance of the HI at Site M can be addressed as a specific component in the site-wide ELUC as found at 40CFR §761.61(a)(8) to ensure that the remaining PCBs do not pose an unreasonable risk of injury to health or the environment.

Dead Creek

Dead Creek was remediated as part of a time-critical removal action. Contaminated sediment was removed in 2001 and 2002. In some areas, additional underlying soil was removed in 2005 and 2006 along with sediment and underlying soil at Borrow Pit Lake connected to Dead Creek at its southern end. Cleanup levels to be met were based on site-specific ecological risk-based concentrations (RBC) for the protection of forage fish. For PCBs, the RBC is 0.58 ppm which would be below the PCB conservative risk threshold of 1 ppm for human exposure.

The *Sauget Area 1 Dead Creek Final Remedy Creek Bottom Soil Engineering Evaluation/Cost Analysis Human Health Risk Assessment* (ENSR, April 2006) was reviewed by LCD. The remaining maximum PCB concentrations in soil at Dead Creek segments B, D, and E exceeded 1 ppm, with respective 95% UCL exposure point concentrations of 21.11, 2.2, and 0.55 ppm. These segments were characterized for risk in the assessment. After some additional hot spot removal of PCB-contaminated soil in Segment B of Dead Creek, the potential risks associated with contaminated soil to a

recreational teenager, recreational child, and construction worker were calculated to be within the acceptable target risk range of 10^{-4} to 10^{-6} and the hazard index (HI) is less than 1. Residual PCB in soil beneath the water-filled Segment B of Dead Creek is further isolated by an armored impermeable liner.

The human health and ecological risk assessments for Dead Creek adequately demonstrate that the removal actions are sufficient and that the remaining PCBs will not pose an unreasonable risk of injury to health or the environment.

Residential Area

LCD referred off-site PCB contamination in residential areas of East St. Louis and Sauget to CERCLA on January 7, 2013. During our review of the RI/FS and supporting documents for this consultation, we note that levels of PCB and dioxin/furan (TEQs) present in soil, waste, and leachate are the main driver of unacceptable risk (cancer and non-cancer) found at Sites G, H, I, and L for the construction worker, utility worker, and/or outdoor industrial worker via ingestion/dermal contact.

Further, thirteen samples taken at eight locations along Queeny Avenue as part of the utility corridor investigation at Sites H and I found significant concentrations of PCB and dioxin/furan (TEQs) above their respective risk-screening level. Significant PCB levels were detected in eight samples at 5, 8, 26, 88, 249, 1028, 1466, and 8850 ppm and in six samples at 1.4, 8, 35, 101, 272, and 394 ppb for dioxin/furan (TEQs). This contaminated area along Queeny Avenue is a main thoroughfare that is across the corner and within 250 feet of the entrance to the Sauget residential area located on Queeny and Nickell Avenues. Site H also has exposed slag at grade and PCBs were disposed of here and at adjacent Sites G and I.

We note this because PCBs and dioxin/furans (TEQs) were detected in the Sauget residential area and elevated levels at four residences and a park were specifically noted in our January 7, 2013 referral to CERCLA. Slag was also encountered at the Sauget residences where PCB exceeds the RSL and could be similar to the slag noted at Site H. The similarity between Sauget Area I Site contaminants and the contaminants/levels identified in the adjacent Sauget residential area suggest a possible link to this off-site contamination. It could be related to historical releases during transport or land filling of wastes at Sites G, H, and I, grading or construction activities in the immediate area, or use of industrial fill within the residential area.

We believe this possible connection between the Site and presence of PCB (and dioxin/furan) in the Sauget residential area should be investigated further. The Proposed Plan should consider proposing a risk assessment of PCB and dioxin/furan (TEQs) contaminants at the four Sauget residences and park, with possible cleanup if risks are found to be unacceptable. Further investigations and risk assessments are also recommended for the remaining Sauget residences.

Summary

Superfund should consider implementing the following TSCA components for the Sauget Area 1 Site. We believe these remedial actions for the Site would be compliant with TSCA 40 CFR §761.61(c).

1) Based on PCB concentrations in soil/waste at Sites G, H, I, and L presented in the RI/FS, we recommend a soil cover that at a minimum, meets the parameters found at of 40 CFR §761.75(b)(1)(ii) through (v), or the installation of the contingent RCRA Subtitle C caps if the pilot study concludes that PABS is not feasible.
2) Superfund should require the PRPs to determine the concentration of PCBs present in DNAPL and liquid from any additional bedrock DNAPL recovery wells. Manage any recovered fluids/ DNAPL greater than or equal to 50 ppm PCBs as a liquid PCB remediation waste and require storage in containers and off-site disposal be performed in accordance with 40 CFR §761.45(a), §761.61(b)(1), and §§761.65(b)(1) or (c)(1), or in the alternative, require a plan for risk-based disposal at 40 CFR 761.61(c) be submitted subject to EPA approval.
3) Ensure that the PRPs identify and manage all generated bulk PCB remediation waste in accordance with 40 CFR §761.61(a)(5).
4) Ensure a minimum thickness of 6 inches of asphalt cap at the Site G West parking area.
5) Add PCBs to the parameter list for the groundwater monitoring well network to assess their off-site migration.
6) Ensure that the specific components of the Sauget Area 1 Site ELUC identify and restrict PCB-contaminated areas in accordance with 40 CFR §761.61(a)(8).
7) The Proposed Plan should specifically detail how each component of the final Preferred Alternative for the Sauget Area 1 Site will meet TSCA requirements. Consider requiring a site-specific risk-based disposal plan to be submitted by the PRPs as part of the final remedy that address all TSCA requirements, subject to EPA approval.
8) Consider adding additional investigations and assessments in the Proposed Plan to address off-site releases of PCBs (and dioxin/furans) to residential areas in Sauget from the Sauget Area 1 Site.

If you have any questions regarding these recommendations, please do not hesitate to contact me at (312) 886-7566 or bardo.kenneth@epa.gov.